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## THE MAKING AND RE-MAKING OF CLAY TABLETS<sup>1</sup>

### INTRODUCTION

The invention of writing in Mesopotamia marks a watershed in the quantity and nature of information available for the investigation of its ancient cultures. The sheer volume of documentation and the vast scope for research on it traditionally have led Assyriologists to ignore the physical objects on which inscriptions are found. But clay tablets and other text vehicles are artefacts in their own right, susceptible to a range of analyses and capable of yielding a wide range of information about scribal practices and the ancient environment. This paper focuses on claims and evidence for the re-use, and particularly recycling, of tablets.

### MAKING A TABLET

Before discussing re-use of tablets, it is important to consider briefly the processes involved in the production of tablets. Rarely is much thought given to how clay tablets were made in antiquity. Often it is simply assumed that they are crude mud-pies, roughly shaped in the hand. For the ancient scribe, however, there was a little more to it than that. Before the moment came to shape a tablet, first the raw materials had to be sourced and prepared. The clay<sup>2</sup> most readily came from the sediments in riverbanks and canals, although inland clay pits could also yield appropriate material. The texts themselves are almost entirely silent on the origins of the clay, but from Neo-Babylonian colophons we learn that the clay for school tablets

<sup>1</sup> This paper combines elements of presentations given by Taylor at the 55<sup>th</sup> Rencontre Assyriologique Internationale, Paris (July 2009), and by Taylor and Cartwright at the 7<sup>th</sup> International Congress on the Archaeology of the Ancient Near East, London (April 2010). A more detailed presentation of the scientific evidence has appeared as CARTWRIGHT - TAYLOR 2011. Concise accounts of tablet making and recycling are available in TAYLOR 2011; this paper complements and

updates those accounts. Further research on this topic is in progress, and Taylor is preparing a detailed survey of the physical features of tablets across the range of the cuneiform corpus. Where British Museum object numbers are quoted, images are available in the online collections catalogue: [http://www.britishmuseum.org/research/search\\_the\\_collection\\_database.aspx](http://www.britishmuseum.org/research/search_the_collection_database.aspx).

<sup>2</sup> Strictly speaking it is actually silt, a low grade by a modern potter's standards.

destined to be dedicated to the temple would be gathered from a pure place outside the city<sup>3</sup>. A range of properties would have been available, and the scribes would have learned how each type of clay behaved. Coarser clays are less plastic and dry more quickly, for example; it would be interesting to experiment with the alluvial clays of the Euphrates to test their properties. Certainly a range of different types is visible in the finished tablets. The clay would need to possess a suitable level of plasticity, but other considerations were also taken into account. It is assumed that the raw clay was levigated to remove any inclusions which could interfere with the writing process were they left at the surface. Levigation works by mixing clay thoroughly with water and leaving it to stand. The coarser particles (including any pebbles) will sink to the bottom while the water and any organic impurities (such as plant material and shells) will rise to the top and can be poured off. What remains in the middle will be a layer of fine textured clay. Generally speaking, tablets are free from pebbles and other inclusions, but actually it is not uncommon to find even large stones in tablets. Groups of tablets containing stones are known, particularly from Nuzi and Nimrud, or Neo-Babylonian school tablets like BM 31748. Stones can indeed be found at the writing surface, and seem not to have hindered the inscription. Various examples of this phenomenon can be cited (see *Fig. 1*): Ur III administrative text BM 16870, Neo-Babylonian chronicle BM 25091, Neo-Assyrian list of deportees K 173, or Neo-Assyrian extispicy query Sm 524. The presence of these inclusions has implications for the processing of the clay, which will be resumed below.

Old Babylonian school tablet BM 61416 (see *Fig. 1*) contained a significant quantity of plant material, the presence of which is betrayed by the voids left behind in the matrix. We also find large shells (molluscs) within tablet matrices, such as Old Babylonian inheritance contract BM 16831 (see *Fig. 1*). The clay used in such tablets cannot have been properly levigated. If it had been, the organic matter would have floated to the surface and been skimmed off and discarded. Whether processed or not, tablet clay could be kneaded; this mixes the wet and dry portions and removes air pockets. It can also help to align the clay platelets and give the material plasticity.

Finally comes the stage of forming the tablet. There are many different shapes attested, varying according to genre, time, place and also practical and aesthetic considerations. There is some evidence of standardised tablet sizes, which opens the possibility for pre-fabrication. Although few blank tablets are known, it is likely that many more were once produced, but have not been retained by their modern excavators<sup>4</sup>. They could have been produced by someone other than the scribes themselves – analogous to the situation known from Mycenaean Linear B tablets from Crete<sup>5</sup> – but there is no evidence for this practice in Mesopotamia, and it seems unlikely in most contexts. Examples have been found of what may be loaves of tablet clay from which scribes could tear off tablet-sized lumps as required<sup>6</sup>. We can reasonably expect such loaves to have been more common than present evidence shows.

<sup>3</sup> GEORGE 2010.

<sup>4</sup> Additional examples are known from archaic Uruk (ENGLUND 1994 pls. 53, 115-116), Old Babylonian Terqa (BUCCELLATI - KELLY BUCCELLATI 1983, p. 49) and Late Babylonian Uruk (HOH 1979, p. 30).

BM 141788 is another blank Ur III tablet.

<sup>5</sup> See PALAIMA 2003, p. 174 for references.

<sup>6</sup> GASCHÉ - DE MEYER 2006, p. 369 and BEYER 1983, p. 50.

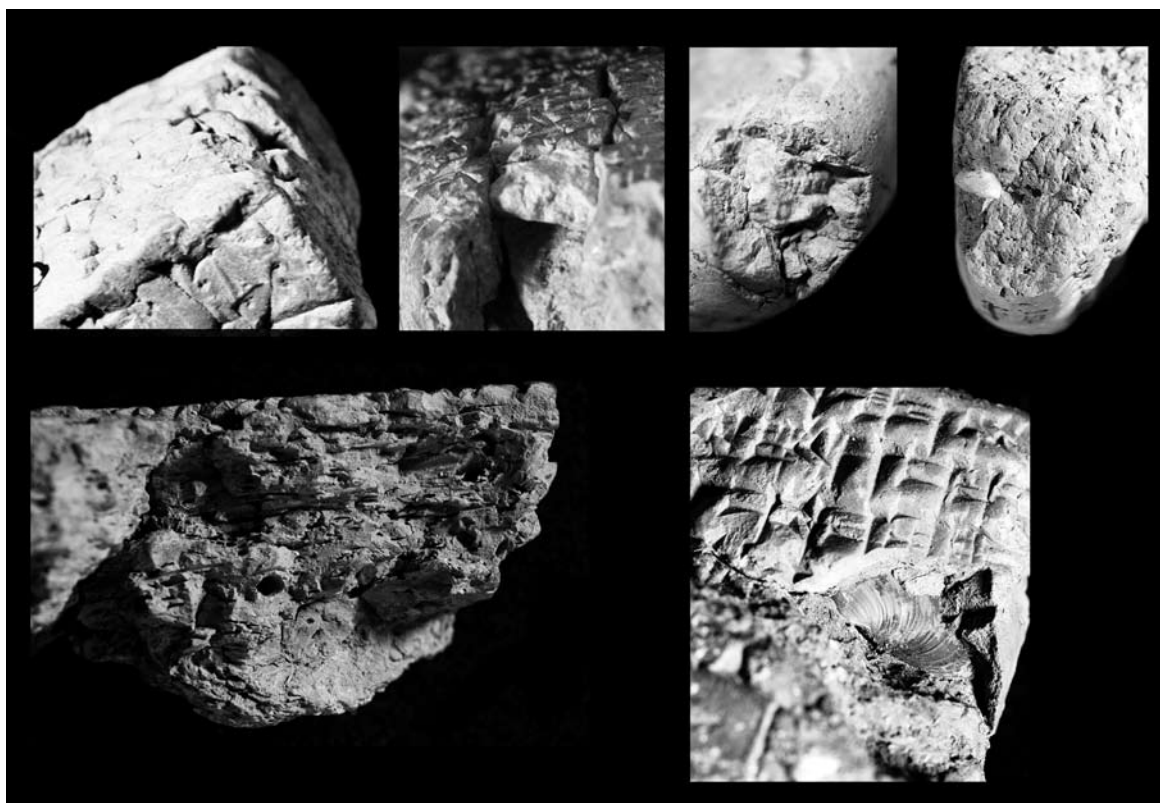


Fig. 1 – inclusions in clay tablets: (top row) BM 16870, BM 25091, K 173, Sm 524; (bottom row) BM 61416, BM 16831. Reproduced by permission of the Trustees of the British Museum.

Many tablets survive now only in broken form. This allows us to look at the internal structure for clues to manufacturing techniques. Unfortunately, a well-made tablet often does not reveal such clues. This lack of evidence does not equate to evidence of absence, however, as proven by the partial visibility of structure known to exist in envelopes. These were typically made by folding a thin sheet of clay over itself (and of course around the tablet it was to enclose). Within a single example some folds are visible, others not. It is likely that trainee scribes were taught how to shape tablets from an early age. These methods could have been arbitrary, but would nevertheless have been standardised. It is reasonable to assume that commonly exercised physical tasks in the tablet making process were carried out using muscle memory.

The simplest tablet manufacturing technique would be to hand-mould a lump of clay. This could result in crude-looking tablets. Many examples of tablets made from more sophisticated folding methods are attested from a wide range of periods and sites, in tablets with texts of various genres<sup>7</sup>. A very clear example is provided by BM 26783, which is made from rolled strips of clay, akin to the envelope-making technique. Thin strips of clay are folded over each

<sup>7</sup> Saggs, *CTN V* provides some photographs of tablets from Neo-Assyrian Nimrud, showing the

structures visible inside; see also CHARPIN 2002, p. 39 for an example from Mari.

other, the layers perhaps being stuck together with water<sup>8</sup>. There is nothing about the content of BM 26783 that would require or stimulate special care. It is an ordinary Ur III administrative tablet. And it is implausible that the scribe responsible would have arbitrarily chosen the method for that tablet alone. The technique is of such complexity, and is accomplished with such aplomb, that it would doubtless have been learned and practised behaviour. It was just how that scribe made his tablets. We can also extrapolate beyond that, since such behaviour would probably have been learned at “school”, so it is unlikely to be the eccentricity of a single scribe.

Another technique, observed in a Neo-Babylonian administrative document, sees lumps of clay stuck together in a grid, overlain with a layer of fine clay<sup>9</sup> (see *Fig. 2*). The thin top layer is vulnerable; it is not clear what the advantages of this technique would be. Whiting mentions a tablet from Old Babylonian Tell Asmar made from two parts, now broken along the join, splitting obverse from reverse<sup>10</sup>. This type of damage is very rare, so the manufacturing technique is unlikely to have been common. Sometimes a core of coarse clay was sheathed in a layer of finer material<sup>11</sup>. Ludwig discusses the construction of literary texts from Old Babylonian Ur<sup>12</sup>. She records evidence of manufacture by rolling, and of the use of a core and skin technique, with rough clay containing grit, shells and plant matter overlain with a layer of very fine clay. There is also evidence of slips – pastes of diluted clay – being applied to tablet surfaces to increase their aesthetic appeal; this is particularly noticeable in some Middle Assyrian and Neo-Babylonian documents. While most tablets are small enough that they fit into the palm of the hand, there were also larger ones, and these may have needed a frame of some kind.



Fig. 2 – YBC 8955, showing the lumps used in its manufacture. Yale Babylonian Collection.

#### RE-USE AND RECYCLING

The nature of clay is such that it is susceptible to re-use; this is provided that the tablets were not baked, which most were not in antiquity. Perhaps stimulated by modern cultural trends, the idea of recycling the clay of old tablets to make new ones has grown very popular in Assyriology. Nowadays it seems widely to be believed that tablet recycling was standard practice in all contexts. Yet despite the idea being in circulation for many decades, very little in the way of theory has been spelled out in print.

<sup>8</sup> In other tablets a thin bonding layer is visible between inner core and outer skin. Anyone familiar with pastry making will appreciate the technique.

<sup>9</sup> Thanks to Lee Payne of Yale Babylonian Section for bringing this example to my attention, and to Ben Foster for permission to publish the photo-

graph.

<sup>10</sup> WHITING 1985, p. 179.

<sup>11</sup> Cf. BIGGS 1974, p. 22 on the evidence for a core plus skin technique at Abu Salabikh, and the apparent distinction from contemporary tablets from Fara.

<sup>12</sup> LUDWIG 2009, pp. 8-12.

Civil<sup>13</sup> set out his hypothesis that: "... in a well kept é-dub-ba-a no exercise tablets were kept for a long period of time. An occasional exercise tablet may have been misplaced and lost, and thus saved for posterity, but the bulk of the tablets was in all likelihood destroyed during the normal course of school activities." This was based on "some assumptions about the use and preservation of school exercises" and archaeological evidence in the form of "twisted and kneaded exercise tablets in various stages of 'melting'" (and erased tablets). Faivre<sup>14</sup> hypothesises two grounds for the recycling of tablet clay: 1) everyday use of clay for tablets required the laborious selection, processing and stocking of large quantities of clay; 2) most documentation had ephemeral function.

The assumption of recycling might explain, for example, why the chronological distribution of the texts we have found is often skewed heavily towards the later part of a period of time<sup>15</sup>. The theory runs that tablets only survive in significant numbers when an archive is suddenly brought to an end. During the life of the archive, redundant documents would be removed and recycled into new tablets<sup>16</sup>. In the case of a school, what survives should be the latest lessons. The theory thus provides a ready explanation for pots, tanks or channels where tablets have been found: as recycling bins. Several archaeological examples of what appear to be recycling facilities are discussed below. Recycling also seems to make sense in terms of the supply of the raw material, clay. Confronted by the large number of tablets surviving, especially from the Ur III period, we sometimes imagine scribes as human tablet-writing machines, churning out vast quantities of documentation all day, every day. This process demands a lot of clay, and the easiest source of that would seem to be other, defunct, tablets. In schools, meanwhile, learners produced many texts; these would not have had lasting value, so could have been recycled to yield the clay for the next day's exercises.

It is worth re-assessing the evidence for the recycling of tablets, to see just what each instance reveals and how it compares to other examples. Can recycling be evidenced in administrative contexts as well as educational? And what form did recycling take in each context? Was it constant, routine and systematic, or *ad hoc*, occasional and erratic? What were the recycling techniques? Was there a standard set of equipment for the purpose?

### 1. The Ur III Inanna temple at Nippur.

The first case study is that of the Ur III Inanna temple at Nippur<sup>17</sup>. The floor 2 level of subsidiary courtyard locus 1 contained a large tank-like structure (locus 78) with internal dimensions of 3.98 m by 2.06 m, and bitumen lining up to 0.76 m (out of 1.73 m height). When excavated it was found to contain a loose fill of unstratified clay together with 34 broken seal-

<sup>13</sup> CIVIL 1979, p. 78.

<sup>14</sup> FAIVRE 1995 also lists contexts in which tablets have simply been discarded.

<sup>15</sup> CHARPIN 1998, pp. 55-56 observes that the duration of archives differs. Private archives retain texts for up to a couple of hundred years (in the case of property deeds), temple archives maybe 70 years, and palace archives maybe 30 years.

<sup>16</sup> TANRET 2002 offers a more nuanced view, and sees re-use of school texts by erasure up to the point where the surface had become too uneven, at which point the tablet would be disposed of. MILLARD 2005 discusses the survival of tablets more broadly.

<sup>17</sup> See ZETTLER 1987, esp. pp. 206-208; 1992, pp. 68-72.

ings (including 18 from doors and 7 from containers), 3 inscribed tags and 11 “broken and deliberately crumpled tablets”, as well as broken stone weights, a clay figurine fragment and a clay stopper. Zettler 1987 p. 207 suggested that locus 78 was “used for the storage of clean clay or clay which could be recycled for making tablets”; it would perhaps be the recycling facility of the temple chancery.

This structure has a capacity of 6.25 m<sup>3</sup>, suggesting that a very large number of tablets would have been moving through it; it could contain enough clay to form over 100,000 palm-sized tablets<sup>18</sup>. Yet in this structure were found the remains of only 11 tablets, out of about 2000 from the temple as a whole<sup>19</sup>. At the floor 1 level of locus 1 the structure was covered over and replaced with a pot of much smaller capacity, no more than 0.5m<sup>3</sup>. The pot contained a small pottery jar, but apparently no tablets, sealings or clay. This part of the temple is said to have been the chancery at both floor levels, so were recycling standard practice here, we would expect that the facility be maintained. We might try to explain this anomalous situation by noting that at least two of the tablets from the structure were school exercises (presumably it was these that were crumpled); does the disuse of the structure indicate an end to scribal training? Further analysis suggests a different interpretation.

In the field notes<sup>20</sup>, the bitumen coating in the structure is described as “put on like a coat of paint and very thin – less than 1/2 mm., more like 1/2x 1/4 mm. This could not be for waterproofing but more likely damp proofing”. The structure could hardly be a levigation tank. This view is further supported by mention in the field notes that a “Retaining wall at east end leans west and looks as if it was put in to hold some loose material. This retaining wall not bonded into structural walls.” Most remarkable of all, however, is the limit of the lining, which reaches only 0.76 m up the total 1.73 m height of the side walls. Were this a recycling tank the scribes would need to have reached down at least a metre (significantly more than an arm’s length) each time they wanted to take clay from it. The structure was partially roofed, making it unlikely that anyone climbed into the tank to work the clay with their feet. The loose and unstratified nature of the fill is also problematic. Had the structure been used to levigate clay the resulting deposit would have been dense, and separated into coarse and fine layers. Were this a receptacle in which recycling by re-hydration and re-moulding was intended, however, we might expect to see many more tablets or wedges visible, or see evidence of multiple layers of waste tablets. None of the surviving tablets or sealings is recorded as being water damaged.

The tablets and the sealings from the structure suggest a date late in the reign of Amar-Suen or the first year or two of Šu-Sin. The three surviving dates on the tablets in the structure range from Amar-Suen year 7 month ii to year 8 month iii, a period of just over one year. The sealings may be dated by means of the fact that on the most common impression the character AMAR of King Amar-Suen’s name had not yet been replaced with ŠU, as is found on later impressions of the same seal. Sealings would presumably have been discarded regularly

<sup>18</sup> This figure is based on measurement up to the top of the lining. If the measurement is taken to the top of the tank itself, the result is a capacity of over 14 m<sup>3</sup>.

<sup>19</sup> For example, 18 tablets were found on floor 1

of locus 1, and more than 24 on the adjacent locus 2 floor 1 (including three practice tablets).

<sup>20</sup> Thanks to Richard Zettler for making these notes accessible to us.

within a short time of their being broken. That these sealings share a date with the tablets suggests that the tablets would have been destroyed within at most 3–4 years of their production. This pattern is not representative of normality for Ur III archives, since we routinely find vast numbers of similar tablets dating back up to 20 or 30 years. The attested phenomenon whereby single transaction documents are preserved even after being entered into summary documents (which also survive) indicates a longer life for primary documentation than might be expected. If the tablets in the tank are the remains of a systematic or periodic clearing of the archives, where are all the other obsolete tablets written over this period, which we would expect even without the huge size of the structure? The survival of tablets from a range of dates is not something that would necessarily be expected given the presence of door sealings in the structure. If this deposit evidences archival clearance, that clearance is partial and episodic, not routine and systematic; and it is not the kind of clearance that could account for the distribution of tablets surviving generally. Even were we to accept this as an example of recycling, it could not be taken as representative.

The presence of non-clay objects in the structure is also problematic. It becomes easier to understand when it is borne in mind that the surrounding courtyard (and other courtyards) also contained waste stone and other materials, as well as tablets. No fewer than 51 tablets were found in the contemporary rubbish pit in locus 137, together with 114 sealings, two tags and stone fragments<sup>21</sup>. These tablets include many rough exercises, blanks and some completely erased tablets. This discarded material looks like a mix of archival and school tablets. Note here that the presence of erased tablets suggests that these were not expected to be recycled by remoulding or re-levigation. A more plausible explanation for the contents of locus 78 is that it represents waste from the courtyard, swept in at the moment when the structure was covered over. What the original purpose of the structure was remains a mystery; one possibility might be a cold storage area.

## 2. A scribal “school” at House F in Old Babylonian Nippur.

The classic example of tablet recycling is that at House F in Nippur, which yielded large numbers of school texts<sup>22</sup>. We presume that tablets produced during the course of the day in such educational contexts would have had very short life spans. Thus here at least we expect to find evidence of recycling. Fittingly enough, no fewer than three structures in this house have been identified as recycling bins. And among the objects found in the house we can see tablets that have been crumpled, suggesting re-use. But when the details of the finds are examined, what is the nature of the recycling here?

A total of about 1400 tablets and fragments was found, with peaks in loci 191 and 205. Such a quantity of clay ought not to fit in any of the three structures interpreted as recycling bins. Actually, clay is reported as being found in only one of these structures – the small box in room 205<sup>23</sup>. The total number of fragments may come to be reduced to less than 1000 af-

<sup>21</sup> ZETTLER 1992, p. 81.

<sup>22</sup> See ROBSON 2001 for the most recent overview

of the remains.

<sup>23</sup> McCOWN – HAINES 1967, p. 64, pl. 160 E–F.



ter joins<sup>24</sup>, still an unexpectedly large number. Moreover, these joins are telling. There are joins between the finds from several loci within the house, and between floors. This tells us that the tablets are a homogeneous group and have been distributed throughout the house in already broken form, over a period of time. The greatest number of joins is between locus 205 floor 3 and locus 191 floor 1, at opposite ends of the house. Whenever the transfer took place, the person who moved the fragments would have had to have walked past at least one of what are supposed to have been active recycling bins en route to a room where there was no bin. They cannot have been transported to the *tanoor* in locus 191 for baking, since they were already broken, such tablets were not baked anyway, and even were they to be baked, the *tanoor* was not the place to do so. The excavators noted some refined clay on the floor in locus 191, which led Stone to conclude that this kitchen was the place where old tablets were soaked and turned into new tablet clay<sup>25</sup>. Were this so, clay storage and processing in House F took place outside bins and jars.

The nature of the texts from House F is another issue. They derive from various points throughout the curriculum, ranging from elementary exercises to literature. In a situation where tablets were being routinely recycled on a daily basis, the more elementary material should not have survived in such great numbers. About half are first phase texts, about one quarter of that elementary material<sup>26</sup>. We could explain the survival of a few tablets as a kind of untidiness, but not this many. While we do not possess every exercise ever written here, it is clear that significant numbers of tablets remained in the house, un-recycled, still bearing the exercises from several years in the past. At the same time, fresh supplies of raw clay must have been brought into the house on a regular basis. In locus 205 many tablets were found used as construction material, including some used to raise the floor level (a process that can plausibly be assumed for other rooms of the house too). This is not something that would be done with material considered expensive or difficult or time-consuming to produce. The 72 cm x 95 cm brick-built box in locus 192 is described as containing “a large storage jar filled with small pots”<sup>27</sup>. This could perhaps be explained as a vessel that contained water. It could have been the water source for clay working<sup>28</sup> and keeping damp the cloths thought to have been wrapped around unfinished tablets, but it would not have been suitable as a jar for clay recycling. And why so many pots in an educational setting where only a very few students would have been taught? Hopefully Robson’s forthcoming detailed analysis of this house will bring greater clarity to the situation. As we will see below, the remains of House F are not representative of Old Babylonian school contexts, and whatever practices were in place there may in any case not be projected automatically into administrative contexts.

### 3. *Ur-Utu’s house in Old Babylonian Tell ed-Der.*

An apparent parallel to House F can be found at Ur-Utu’s house in Tell ed-Der<sup>29</sup>. Here the son of a lamentation priest had been trained. In addition to the large archive found in locus

<sup>24</sup> Thus ROBSON 2001, p. 44.

<sup>25</sup> STONE 1987, p. 57.

<sup>26</sup> According to ROBSON 2001, pp. 48-49 there were 558 lexical and other first phase texts (including 146 el-

ementary exercises) and “nearly 600” literary texts.

<sup>27</sup> McCOWN - HAINES 1967, p. 64.

<sup>28</sup> STONE 1987, p. 57.

<sup>29</sup> See TANRET 2002.

17, school exercises from this boy and also a few from the education of the house's previous occupant were found. Locus 4 was a courtyard with a 70x85x34 cm bin of clay bricks. In and around this bin were found clay and tablet fragments. The number of fragments – 65 – is far fewer than that found in House F, and about half of them were found in the bin, unlike the situation in House F, where virtually none were found in such a structure.

The presence of tablets together with clay in the bin points squarely towards recycling, but several observations should be made. Firstly, during the renovations of Ammi-saduqa year 18 the bin was covered over and not replaced. The archive was still active during the remaining five or so months before the house's sudden destruction, but during this time there were no recycling facilities available. The bin seems to have been linked to the education process. There was apparently a 14-year gap from the end of the education process to the point at which the bin was covered over. Yet only 11 out of 65 tablets from the bin were anything other than school texts, seven of these being letters. After 14 years of further use, the bin should not have retained any school material. The owner seems to have begun carrying out a triage of his archive during the refurbishments, as he moved it from locus 22 to locus 17. This example also suggests that such triages were occasional rather than continual. The material selected for disposal included a field rental dated Ammi-ditana year 28, although five older field rentals were retained<sup>30</sup>.

The material found in the bin belonged to the spectrum of elementary education. Were this the remains of an active bin constantly recycling tablets from the school day, only the most recent lessons should have survived; there should certainly be no stylus exercises. The find is better explained as the gathered remains of odd, leftover tablets. The clay and tablet fill of this bin had overflowed. Tanret suggests that the clay overspill had come from somewhere else, probably locus 22, the old archive room<sup>31</sup>. Furthermore, this bin appears to have been dry; the tablets were not stuck to each other or to the clay, as would have been expected<sup>32</sup>. This is not an active bin frozen in time, but rather a bin that has been filled prior to being levelled over. The clay that over-filled the bin came from elsewhere; this again points to a situation where tablet clay storage took place outside of bins, even when such a structure existed.

Tanret suggests another possible bin in Locus 23 of the house during the previous owner's time; several lentil-shaped school tablets were found in the same area as this poorly preserved structure<sup>33</sup>. This is intriguing, but not compelling. Such lentil-shaped tablets are often found quite widely dispersed around school settings. Scheil records finding a box made of baked bricks in the corner of a courtyard in a private house at Old Babylonian Sippar<sup>34</sup>. It contained an enormous, compact, coherent mass of school tablets from syllabaries and metrological lists to hymns, plus contracts (school model contracts?). Some of them were still complete and well preserved, the others had been used as exercises and were erased with a tool, and bore finger marks. While the exact details are uncertain, it is again clear that this relates to a school context, that the texts come from across the range of the school curriculum, and the objects seem not to

<sup>30</sup> TANRET 2002, pp. 5, 8.

<sup>31</sup> TANRET 2002, p. 151.

<sup>32</sup> TANRET 2002, p. 153.

<sup>33</sup> TANRET 2002, pp. 146-147.

<sup>34</sup> SCHEIL 1902, pp. 33-34.

be “melted down”, so to say. Different again from House F at Nippur and Ur-Utu’s house at Tell ed-Der is No. 7 Quiet Street at Ur, the remains of another Old Babylonian school. There were found more than 100 school<sup>35</sup> and other tablets in a private house. No recycling bin of any kind was found there.

#### 4. *An industrial facility at Old Babylonian Susa.*

A fourth example of tablet recycling comes from Susa<sup>36</sup>. In a building originally labelled the “School”, excavators found several groupings of clay mixed with fragments of broken school tablets, some of which were water-damaged. Outside in Attaru-Uktuh street was another deposit containing clay, much smaller tablet fragments and a few sealings.

Gasche and De Meyer pointed out that while school tablets were found here, this is not domestic (or temple) architecture; if we interpret these remains using Mesopotamian parallels, this should not be a school. It looks industrial, apparently associated with the adjacent administrative centre or the building across Kuku street. This means that waste school tablets have been brought in from outside. The implication of this is that recycling facilities were not available in the school itself. An interesting further point is that the texts on these tablets again range from stylus practice to advanced exercises; these thus derive from a lengthy period of education. They are not the product of a snapshot of education, with a day’s lessons being re-worked ready for the next day.

While the physical remains do support recycling of tablet clay, it is noticeable that, despite the proximity of the large administrative building, all the tablets seem to be school texts. There are also some sealings. The number of tablets is again low compared to House F – about 30 plus dozens of very small fragments<sup>37</sup>. It represents a tiny fraction of the total 400 litres of clay found there. It is questionable whether we are entitled to interpret the finds on the basis of these inscribed fragments.

Processed tablets and fresh clay were mixed together in this site. This and the preponderance of fresh to old clay suggest that the supply of old clay was greatly inadequate. The implication of this is that we are not witnessing an archive steadily being consumed from behind. There must have been far too few old tablets to permit the manufacture of the required quantity of new tablets, if this was indeed the purpose of the clay working.

Gasche and de Meyer attempt to make sense of the different clays by reference to the existence of letters and other tablets from Susa and Tell Ed-Der that have fine clay layers wrapped around lower quality cores<sup>38</sup>. The two types of clay were mixed together in the Susa deposits, however. This would mean one of two things. One would be that the processed clay was considered too insignificant to merit retention, and that there was therefore no source of cleaner clay for the outer layers. The other possibility would be that a vast quantity of refined clay was

<sup>35</sup> The tablets seem to range mostly from the middle to late stages of education, and may form more than one group.

<sup>36</sup> See GASCHE – DE MEYER 2006.

<sup>37</sup> It is common in clay-working that old clay to

be recycled will be broken down before soaking in water.

<sup>38</sup> GASCHE – DE MEYER 2006, p. 368. Cf. FAIVRE 1995, p. 58 for a parallel from Mari, and LUDWIG 2009 cited above.

being produced for those outer layers, and there was no source of unrefined clay, which was to constitute the majority of the new tablets. Neither alternative seems plausible. Tablets made from a rough core and fine outer layer also allow us to say something about their manufacture and re-use more generally. Erasure would be unfeasible, since the outer skin would soon be worn away. It would not be possible to form a new example by re-moulding an old tablet made in the same way. The result would be a tablet made from homogeneous mixed clay. Adding a new layer of clean clay to an old core would be ineffective on account of the properties of clay; in any case such a technique would rapidly yield an unwieldy tablet, unless a portion of the original clay were discarded. Re-levigation would be an option. At this point the scribe would either have to separate the core clay from the skin clay, or else bring in new clay to replace one or other layer. This would soon result in the scribe having far too much clay for his needs. How would he deal with that? Discard some of the excess? Add rough material to cleaned clay?

It is not at all clear that the clay here was destined for use as tablets. The clay moulds found in and around the building, and the apparent pottery workshop opposite the front entrance, suggest that the clay may instead have been intended for other uses<sup>39</sup>. If private houses could command a recycling bin, why could a large administrative centre not do so, such as was posited for the vast structure in the Ur III Inanna temple at Nippur (discussed above)?

#### 5. Area SM in Old Babylonian Ur.

A building near the Giparku at area SM in Ur has yielded two finds of tablets that have been interpreted as evidence for recycling. One group was found inside the building; the other was found outside, against a wall. The excavation reports are contradictory as to the nature of the material, a situation exacerbated by confusion over the recorded findspots of the tablets, as well as re-numbering issues. The final report states:

*The tablets of the second hoard [outside] were for the most part intact whereas these [inside] were generally destroyed, several of them being kneaded together into a single lump while others were twisted up and deep finger-marks had obliterated most of the writing. They formed a curious mixture, consistent as regards the two lots, and it is probable that both lots were marked for destruction and re-manufacture, but in one case the process had begun, in the other the tablets were waiting their turn.*<sup>40</sup>

The tablets of the first group were a mix of Ur III administrative texts (dating from the second half of Shulgi's reign to the early years of Amar-Suen's) and Old Babylonian school exercises. They were apparently "all in bad condition and the tablets crushed and distorted"<sup>41</sup>. Those of the second group, however, were "mostly small business documents of the Larsa period" and "for the most part intact"<sup>42</sup>. The two groups so described are in no way consist-

<sup>39</sup> Reade (personal communication) suggests that something similar may have been intended for two Old Babylonian tablets found in a workshop at Tell Taya (for which see READE 1973, esp. p. 171).

<sup>40</sup> WOOLLEY - MALLOWAN 1976, p. 80 n. 1; MIL-

LARD 2005, p. 306, n. 8 interprets the remains as baskets of tablets tipped as building rubble.

<sup>41</sup> WOOLLEY - MALLOWAN 1976, p. 80.

<sup>42</sup> WOOLLEY - MALLOWAN 1976, p. 80.

ent, and there is no clear evidence to suggest that they were related. In the preliminary report Burrows describes the finds together as follows:

*... a dump and tablets, very numerous but mostly deliberately destroyed and often glued together in shapeless masses ... Besides school exercises, multiplication tables ... numerous fragments of large account-tablets and text, and hundreds of very small business notes that have mostly escaped destruction, there are many pieces of large vocabularies*<sup>43</sup>

while Woolley writes:

*there were numerous tablets of varied character and apparently of different dates, all in very bad condition, mostly broken and often intentionally defaced, mixed up with quantities of shapeless lumps of clay*<sup>44</sup>.

In the original field notes the two finds are described separately:

first group: *here t[he]r[e] were found masses o[f] tablets o[f] all dates (?) + lumps o[f] clay, (all in bad condition) probably a dump when – old tablets were being kneaded up for re-use: these were collected but made a v[ery] poor show.*

second group: *... were found large numbers o[f] tablets, mostly v[ery] small, business documents chucked out.*

Collating these various accounts with the catalogue of finds, we see Ur III administrative texts and Old Babylonian school exercises, but no Larsa period documents. There is a lack of clarity about the findspots of some tablets, but most are said to come from the second (intact) group; these are Ur III administrative texts, mainly in perfect condition. Most of those said to come from the first (destruction) group are Old Babylonian school exercises. These latter are mainly early exercises, with some later ones and some mathematical tablets. Of the tablets now in the British Museum, the only ones that show signs of destruction are some fragments of Old Babylonian type II school tablets (with exercises from early in the curriculum, such as personal names and the list of trees and wooden objects) labelled as U. 7838 (see Fig. 3); they are perhaps torn into fragments, and in some cases unformed clay is attached to their surface. It is possible that the excavators did not retain many tablets from the dump.

If the tablet dump is evidence for recycling, it shows that a bin or pot was not required. This

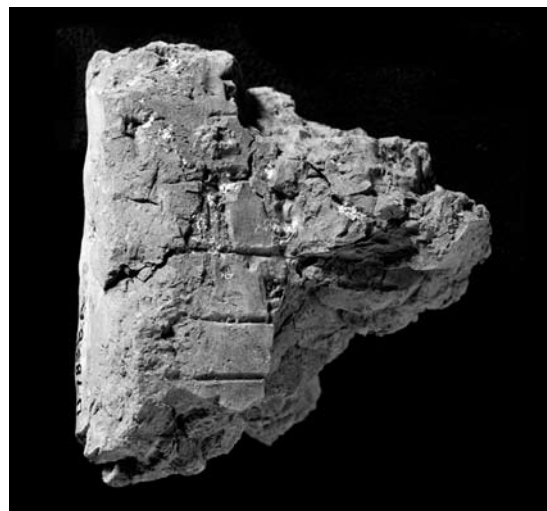


Fig. 3 – One of the U. 7838 fragments from the destruction dump. Reproduced by permission of the Trustees of the British Museum.

<sup>43</sup> Burrows in Woolley 1927, p. 405.

<sup>44</sup> WOOLLEY 1927, p. 412.

instance is once again school-based. It cannot be an example of working scribes recycling their old archives, nor can it be an example of a scribe training with both school texts and practice administrative documents, recycling both as he went along. If the Ur III tablets are integral to the deposit, they must represent a young Old Babylonian trainee scribe making use of a cache of dumped tablets; they date from well before the end of Ur III activity in Ur. The other group of tablets, found against the exterior wall, is most simply explained as a dumped archive. Were this part of the recycling process, what function would have been served by their being left outside? Simply “waiting their turn” is unconvincing. These tablets were not even affected by exposure to the elements.

#### 6. *A scribal facility at Old Babylonian Isin.*

The Old Babylonian building excavated during the 1974 season in the Nordabschnitt N II at Isin<sup>45</sup> contained a room (“room 5”) with a brick basin and five 40cm high jars set into the floor. These jars contained fine clay (but no tablets), and in this part of the room were found tablet fragments and lumps of processed clay; nearby were deposits of fine clay. The jars belonged to the later level of the earlier Old Babylonian phase (I), while some simple brick installations nearby belonged to the earlier level of that phase. None of these features survived into the later Old Babylonian phase (II). Elsewhere in the building and in the street outside were found more than 200 tablets with school exercises (ranging from early lists to advanced literary texts) and administrative texts or letters. The excavators interpreted the structures in room 5 as clay preparation facilities, probably correctly; there is no clear evidence of tablet recycling.

#### 7. *An administrative building in Area F at Terqa, Syria.*

The early second millennium administrative complex in Area F at Terqa<sup>46</sup> has a “scribal installation”, with a small platform of baked bricks and a “medium size jar” (with a diameter approximately that of a brick) containing clay. On the floor around this were found four tablet fragments and a jar, a metre away a jar containing six tablet fragments, and a further metre away a 40 cm x 150 cm bin built into the wall. This bin contained only a single fragment and a clay box; the excavators interpreted it as a more permanent storage facility<sup>47</sup>. The platform evidently had sustained use, with the remains of two levels being preserved. The jar also lay above two other, smaller, jars containing clay. This scribal installation could well have been used for preparing clay for tablets, and could plausibly have been used for recycling (by re-hydration), although there is no compelling evidence for that. The final report should clarify some of the issues.

#### 8. *An administrative complex at Hammam et-Turkman, Syria.*

At the administrative complex at early second millennium Hammam et-Turkman<sup>48</sup> was found an installation consisting of a water conduit fed from a well further west, a basin and

<sup>45</sup> HOH - WALKER 1977, pp. 22-25; WALKER in POSTGATE 1975, p. 58; EDZARD - WILCKE 1977.

<sup>46</sup> See BUCCELLATI - KELLY BUCCELLATI 1983, p. 49, photo III.2, fig. 3.

<sup>47</sup> Cf. the apparent file boxes at Nimrud (WALKER 2008, pp. 258-259).

<sup>48</sup> MEYER 2004.

a platform. Purified clay was found on the platform and in the basin; a few sealed bulla fragments were found higher up on the basin. Taken together with a bronze object presumed to be a stylus, the remains have been interpreted as an area where scribes processed tablet clay. While clay processing does indeed seem to be a plausible function for the installation, its scribal nature is less clear. The identification of the stylus is uncertain and grounded on admittedly circular argument, there is no light nearby for writing to have taken place, and the few tablet fragments found could have been transported in with dirt fill during refurbishment. It is an intriguing possibility that this may be a scribal preparation area, but far from certain; its features are unique.

*9. The Ekur-zakir family's house in Late Babylonian Uruk.*

The last example of recycling comes from a scribal family's house in Late Babylonian Uruk<sup>49</sup>. There two installations of asphalt-covered bricks associated with roughly-formed fine clay lumps were found<sup>50</sup>. Taken together with the school tablets and fragments scattered across the whole area, and pointed bone objects presumed to be styli, these structures have been interpreted as clay-working facilities. This set-up may show clay being worked, but it does not show recycling. While some clay lumps were found on these structures, and some fragments were found next to them, there is no report of tablets being found on them. Despite the presence of no fewer than two supposed recycling facilities, tablets were found strewn throughout the house. The excavators drew attention to the presence of numerous terracotta plaques found in the house; these may have had a connection to the clay-working facilities. No such clay-working structures have been identified during the period of occupation of the previous inhabitants, the Šangu-Ninurta scribal family<sup>51</sup>. When they left the house, they buried their tablet collection in jars; other tablets and fragments were found throughout the house. Even for the Ekur-zakir family, in level II, when education seems to have been completed, the structures had disappeared. Hopefully the final report will clarify the situation.

#### RE-USED TABLETS

Beyond the posited recycling bins discussed above, the evidence of the tablets themselves should be considered. This evidence is most conveniently discussed by type of re-use.

*Erasure and re-use.*

One suggested method for the re-use of tablets is the complete erasure of an inscription to make room for a new text. There is evidence of this technique, but it is rare. It is regularly seen in a particular type of Old Babylonian school tablet – the so-called “type II” tablets, where a

<sup>49</sup> See ROBSON 2008, pp. 237-240, with references.

<sup>50</sup> See HOH 1979, pp. 28-29, pls. 10b, 69.

<sup>51</sup> See ROBSON 2008, pp. 227-237, with references.

model text on the left-hand side is copied by a learner on the right-hand side. While the model was retained, the copies were repeatedly erased to make room for new attempts. It is this consideration that determined the use of the erasure technique here. Furthermore it suggests that these tablets would have been used over only a short period of time. For re-inscription would require the remaining clay still to be sufficiently moist on each subsequent use to allow the wedge to be formed. In Iraq a tablet might dry in under an hour unless measures to control the environment around it were taken, such as using damp cloths to maintain the moisture levels. Dried, unbaked, clay is porous and susceptible to water damage. Adding water to a dried tablet will not return it to a properly plastic state, but will turn it to sludge (a process known as “slaking down”<sup>52</sup>). There are examples from across the range of cuneiform to suggest that re-moistening was not a technique practised by scribes. Meek describes additions to Nuzi tablets after the clay had started to dry, observable in the lightness of incision of the wedges; he even notes two tablets almost entirely inscribed like this<sup>53</sup>. The same phenomenon can be observed in tablets from the Ur III period, such as BM 12923 (see *Fig. 4*), BM 19719 (see *Fig. 4*) or BM 23687. The field survey texts from Ur III Girsu (e.g. BM 12391; see *Fig. 5*) are another good example. The measurements are always written as normal, but the yields are written in varied styles: sometimes the script is as normal, sometimes it is light due to being written after the clay

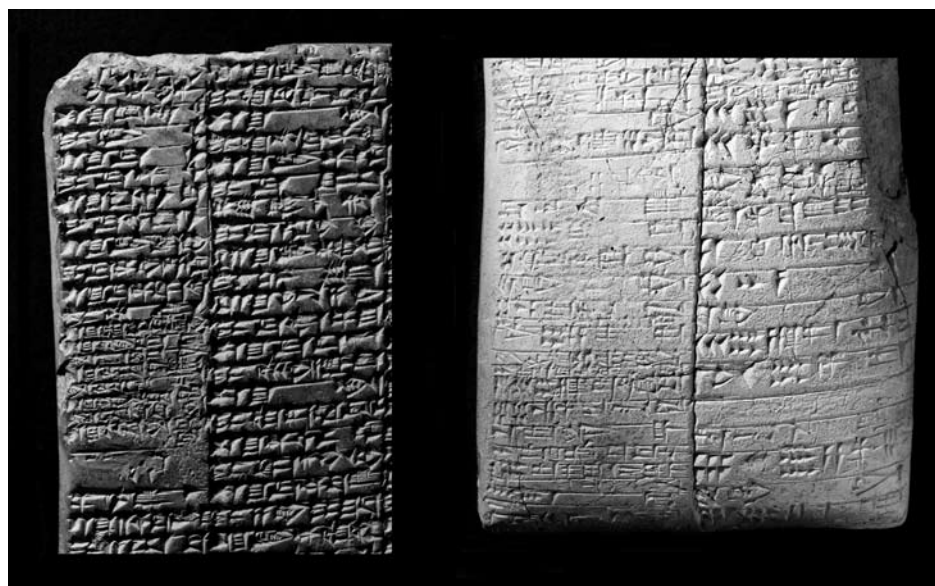


Fig. 4 – (left) BM 19719, showing text added after the main inscription; (right) BM 12923, showing the final – left – column written after the tablet had started to dry. Reproduced by permission of the Trustees of the British Museum.

<sup>52</sup> Here one might gather scraps of dried clay (or leave damp clay to dry) then cover with water. After soaking and settling for a few hours to a few days, any excess water would be poured off and the

sludge left to dry, stirring every so often. Once no longer sticky the clay would be re-kneaded ready for use again.

<sup>53</sup> MEEK 1935, p. ix.





Fig. 5 – (left) BM 13141, showing the three different attempts to inscribe the tablet; (right) BM 12391, with text added after the main inscription. Reproduced by permission of the Trustees of the British Museum.

had started to dry, and sometimes the space is left blank – in such cases the clay must already have dried. BM 13141 is presumably a school practice tablet; it contains the first few lines of an Ur III administrative text apparently written as the tablet was in three stages of drying (see Fig. 5). The tablets from the Library of Ashurbanipal offer another clear example. Some tablets have colophons that are obviously written after the clay had dried (e.g. K 162)<sup>54</sup>; there are even two examples of colophons added in ink (K 10100, DT 273).

The erasure and re-inscription technique is clear enough also in miscellaneous other Old Babylonian school tablets, such as lentil-shaped BM 86010<sup>55</sup>. BM 104767 may be an example of an Ur III administrative tablet being erased for re-inscription. Only the obverse was erased, however, and it was not re-inscribed. This may simply be the product of scribal training. Also to be attributed to a school setting are examples like Old Babylonian BM 108448. It has on the obverse the remains of the first three lines of a text plus wedges aligned at 90 and 180 degrees to that, and on the reverse a few signs written more or less at 90 degrees to the inscription on the obverse. Jursa points to three possible instances of erasure and re-inscription among Neo-

<sup>54</sup> There was even a special abbreviated colophon for such cases.

<sup>55</sup> See further the photos of school tablets published in TANRET 2002; the testimony of SCHEIL 1902,

pp. 33-34; the examples from the Ur III pit in Nippur, in ZETTLER 1992, p. 81; and perhaps Old Babylonian lentil-shaped school tablet from Nippur CBS 5959 (PBS 11/3 no. 66).

Babylonian administrative documentation<sup>56</sup>. Two of these are in the British Museum collections (BM 42373, BM 42425); collation by Taylor yields that any wedge traces do after all run in the same direction as the inscription, suggesting that they may be simple erasures rather than evidence of re-use of tablets. BM 42425 is in any case a school tablet, so is not valid evidence of this phenomenon in an administrative context. A stronger claim comes from a late second millennium letter from Tell Munbaqa, on which survive remains of what seems to be a legal text<sup>57</sup>. Three examples have been claimed from the “Hurrian Priest” at Ugarit: two incantations and an offering list in Ugaritic<sup>58</sup>. Erasure and re-inscription has also been reported in letters from Old Babylonian Tell Shemshara<sup>59</sup>, but this remains to be documented. In the case of school tablets, and to a lesser extent letters, the technique can be explained in that the clay would have been fresh, the text would have had a limited lifespan and the tablet could have served as a suitable vehicle for the next text. This would not have been standard practice, however. Apart from the logistical difficulties inherent in the process, the overwhelming majority of tablets show no signs of re-inscription whatsoever. Maul draws attention to a Neo-Babylonian contract which bears the traces of an earlier text written at 90 degrees to the final inscription<sup>60</sup>. The interpretation offered there is that this is the remains of a list of witnesses jotted down before proceedings began. In any case, re-inscription whilst damp is the most plausible explanation. Erasure and re-inscription is not a technique that would be suitable for use on old, long-dry archival tablets.

It is noteworthy that erasure and re-inscription is the method used in the Old Babylonian type II school tablets discussed above. This indicates that it was not possible simply to smooth out the surface of the tablet, as is often suggested; the surface must be scraped away. Erasures in texts are obvious, because of the difficulty of erasing down to the bottom of the wedges; often it is only partially achieved<sup>61</sup>. Many type II school tablets have the right-hand side cut off, after the repeated erasures left the tablet too thin for further use. For this same reason, it would only be possible to erase a non-school tablet very few times before it in turn would be too thin; these were much thinner to begin with and could be inscribed on both faces and sometimes also on the sides, so would be reduced much more quickly than the school tablets. Erasure would also be visible in the profile of broken tablets. No examples have yet been documented. And its use would of course be restricted in the case of tablets made by wrapping fine clay over a rougher core. Furthermore, given how thin tablets are and how much depth would have to be removed each time, we ought regularly to find very thin tablets, but we do not. In general, erasure of whole documents is not something that would be suitable for standard use, or be part of normal scribal experience.

<sup>56</sup> JURSA 1999, p. 20.

<sup>57</sup> MAYER 2001, no. 44. As an isolated find, it is difficult to assess the significance of this tablet. Mayer, p. 1, suggests that a dearth of good quality tablet clay may explain the situation. It is remarkable that the previous text survives so clearly; perhaps this tablet is also a result of scribal training.

<sup>58</sup> DIETRICH - LORETZ 1993 (this tablet appears to be an exercise); DIETRICH - MAYER 1994, pp. 94-101;

DIETRICH - MAYER 1997, pp. 162-174; DIETRICH - MAYER 1997, p. 162 suggest that this scribe may have been economising on clay for texts of low importance and restricted purpose.

<sup>59</sup> LARSEN 1987, p. 220 n. 51.

<sup>60</sup> MAUL 1990.

<sup>61</sup> For a discussion of erasure in cuneiform documents see CHARPIN 1989.

*Enclosure within new clay.*

There is no convincing evidence for new tablets being made by wrapping a layer of fresh clay around an old tablet. Two administrative tablets should be considered here. The first is a tablet from Old Babylonian Mari, which has been partially covered in clay<sup>62</sup>. This is not recycling by re-levigation, nor does it involve the tablet being mangled or broken up, contrary to the evidence of the supposed recycling facilities discussed above. Extra clay is simply added around it. Apparently the recycler was interrupted in the middle of his work, as the tablet is not fully covered and the outer layer is not shaped in even the crudest of ways. The second tablet comes from among a group of school tablets from Middle Babylonian Haft Tepe<sup>63</sup>. It is similar to the first tablet, but with even more clay, far more than would have been needed for a tablet.

Neither example looks plausible as evidence for re-using tablets by adding new clay. If they are evidence of recycling, they must have been very newly made tablets. For wet and dry clay will not bond well together, and the new clay would crack as it dried and shrank around the already dry inner tablet. Adding new clay to a tablet up to 20 or 30 years old is simply not a viable procedure<sup>64</sup>. Furthermore, wrapping so much extra clay around the core rapidly produces an unwieldy tablet. This would also mean that any tablet so produced would not match its counterparts. It is noticeable that institutionally produced tablets tend to fall into groups of similar sizes. The use of enclosure within new clay as a method of manufacture would not permit such groupings as are observable across the cuneiform corpus. It is unsurprising that not a single example has been found among the many thousands of broken tablets where evidence of this technique ought to have been visible. Layers are indeed quite commonly visible. These are produced by the rolling or folding techniques of manufacture outlined in the opening paragraphs of this paper, however. Anecdotal claims to have encountered an old tablet within a tablet are probably misinterpretations of these techniques. Whenever the surfaces of such “inner tablets” are exposed, they are uninscribed and bear no traces of erasure.

*Re-hydration, re-moulding and re-levigation.*

Old Babylonian and Neo-Babylonian school tablets are sometimes found crumpled or damaged, or bearing impressions of objects<sup>65</sup>. This is plausibly interpreted as evidence of recycling (by re-moulding), although other interpretations remain open. Indeed, given that these are discarded bi-products of the education of young children, it would be surprising were such tablets not found crumpled, stabbed with the stylus, or otherwise mutilated in any one of a myriad of different ways. Even in these cases, however, we are looking at tablets that had a very short lifespan. At the time of this crumpling, they must still have been soft. Re-using a fresh tablet by re-moulding is a simple process that does not require a recycling pot or bin. Once the clay had passed the point at which inscription was comfortable, and cracks had started to

<sup>62</sup> CHARPIN 2002, p. 39 fig. 6; CHARPIN 2010, p. 72 interprets this tablet as a small day-to-day tablet being reused once its text had been entered into a summation.

<sup>63</sup> NEGAHBAN 1994, p. 40 fig. 8.

<sup>64</sup> For the same reason, it is not possible to add a new envelope to an old tablet, as already pointed out by CHIERA 1938, p. 72.

<sup>65</sup> See CIVIL 1979, p. 7; GESCHE 2001, p. 57.

appear, the scribe could have re-moistened and re-moulded the tablet. If left longer, a different process is likely to have been followed. Counter-intuitive although it may seem, it is quicker to recycle fully dry clay. It might be expected that tablets due for recycling would have been left to dry then broken into smaller fragments before being placed in a container of water. It is not clear what function crumpling would have performed, unless it was an aborted attempt to re-mould a tablet. Crumpling is not a phenomenon recorded among administrative tablets<sup>66</sup>. This, too, is unsurprising, since dried clay will not crumple; it will simply break. VILLARD 1984 no. 627 reports a tablet from Old Babylonian Mari bearing only traces of a personal name; it seems to have been recycled immediately after having been written. Such immediate re-use of a (presumably rejected) tablet is not particularly surprising, nor does it constitute evidence of a wider practice of recycling obsolete documents.

Another phenomenon requiring explanation is the appearance of wedges within tablets. These can only be the result of tablet recycling by re-moulding. Van Driel records having seen such wedges in some Neo-Babylonian tablets from Sippar<sup>67</sup>, but unfortunately no images or tablet numbers are provided. The extent of the phenomenon cannot be assessed at present. The most likely scenario, however, is one where the tablet that was to form the new document was still moist rather than having dried out over the years in the archives, for the reasons outlined above.

There is relevant physical evidence from tablet clay that should now be considered. The point of levigation is to separate out the constituent parts of the raw clay, which can comprise a variety of accessory minerals and inclusions, depending on its provenance. The presence of stones and shells in tablets exemplified above shows that this clay was not levigated. Furthermore, we can say that this clay would not have been recycled by re-levigation either, since the inclusions could not have survived at least two attempts at removal. We must open our minds to the possibility that scribes sometimes used unprocessed clay. Note that thin-walled land and freshwater shells would not survive kneading intact, removing the possibility even of recycling by re-moulding. Their presence within the matrix shows that these molluscs cannot have entered the tablets after their manufacture (see further CARTWRIGHT - TAYLOR 2011). Furthermore, we need to consider the significance of the presence of plant remains in the tablets, either already in the organic-rich silts selected, or deliberately added to the matrix to reduce shrinkage and cracking. Levigation would remove the former and render pointless the latter. Re-levigation of already levigated tablet clay would be a redundant process; and if primary levigation was not viewed as a necessary process, re-levigation would lack motivation.

It should also be pointed out that not all re-use of tablets was to produce new tablets. Note here, for example, a phenomenon of still unclear purpose whereby deep depressions were carved on the blank reverse of tablets. Four examples may be cited here: 1) BM 104078, an Old

<sup>66</sup> Perhaps the most likely candidates are the archaic Uruk tablets described as “wasters” in the catalogue of *ATU V* pp. 29-55, if these are not in fact school texts. Cf. the crumpled exercise from Abu Salabikh in BIGGS 1974, p. 24.

<sup>67</sup> VAN DRIEL 1998, p. 27 n. 30. Finkel and Maul both report (personal communication) that they have seen wedges in some tablets from Nineveh, but we have not yet been able to find examples.

Babylonian administrative text; 2) Cotsen 52190, an Old Babylonian administrative text (WILSON 2008 no. 30); 3) KTT 363 (Bi.27/48:10; KREBERNIK 2001), an erased Old Babylonian tablet from Tell Bi'a<sup>68</sup>; 4) BM 49742, a Late Babylonian letter from Sippar. The depressions in the first two examples are round, while the other two are rectangular and very close in size to each other. This shape itself is noteworthy, since it would have been harder to make than a round one; it suggests something about the shape of the tool used to make the depressions. In each case the cutting must have been done while the tablets were no more than leather hard, since otherwise the clay would have cracked. Ash. 1924-529 (OECT 13, 26) is a possible fifth example. On the reverse of this Middle Babylonian text is a cluster of five rounded depressions. Whatever the explanation in each case, the depressions were made soon after the tablet's creation, with planning and a degree of care, and presumably performed a function within a scribal setting that either was in itself unusual or was normally performed another way or with different tools.

#### DISCARDED TABLETS

The evidence for recycling tablets must be seen in the wider context of tablet finds. Many examples may be cited of tablets that have been disposed of rather than recycled, undermining the theoretical assumptions for systematic recycling, and providing support for alternative interpretations of the case studies discussed above. The impression presented by House F in Old Babylonian Nippur, for example, is one where tablet clay is not scarce or precious, and tablets and fragments lay around in large numbers, as debris and construction material. Numerous examples of tablets discarded and used as construction material can be mentioned<sup>69</sup>. The corpus of 5,000 tablets from archaic Uruk were not only discarded, but secondarily re-deposited<sup>70</sup>. Also at Uruk Early Dynastic tablets were found among the detritus in the walls of the *pisé* building<sup>71</sup>. The archaic tablets and sealings from Ur were found in layers of rubbish thrown out by an administrative facility (the so-called "Seal Impression Strata")<sup>72</sup>. Most of the tablets from Abu Salabikh were found in rubbish fills<sup>73</sup>. At Fara one group of Early Dynastic tablets was found discarded in rubbish in a drainpipe<sup>74</sup>, while another was found in the mortar between courses of a mudbrick wall<sup>75</sup>. The Old Akkadian tablets from Nuzi were found in more than a metre of fill<sup>76</sup>. Many Old Akkadian tablets from

<sup>68</sup> Mayer (in STROMMINGER *et al.* 1987, p. 17) suggested that the Bi'a example was perhaps used to make amulet blanks. This is unlikely. Other possible uses may be speculated.

<sup>69</sup> The examples here range from almost contemporary re-use to re-use at a much later date. The presence of this latter group here is justified by the claim detailed above that Old Babylonian scribes at Ur recycled Ur III tablets.

<sup>70</sup> Note that many sealings were also found in this debris, and further the many sealings recently found at Tell Majnuna at Brak (see McMAHON - OATES

2007), which mound seems to be entirely rubbish deposits, with no signs of architecture. Here an administrative centre has transported waste some distance from itself. Many thousands of sealings from Arslantepe were also found in rubbish deposits (FRANGIPANE 2007).

<sup>71</sup> NISSEN 1974.

<sup>72</sup> WOOLLEY in LEGRAIN 1936, pp. vii-viii.

<sup>73</sup> HANSEN in BIGGS 1974.

<sup>74</sup> MARTIN 1988, p. 31.

<sup>75</sup> KOLDEWEY 1914, p. 247.

<sup>76</sup> MEEK 1935, p. viii.

Nippur were found in dumps of various sorts<sup>77</sup>. A pavement laid during Ur III renovations of the ziggurat at Nippur was found to contain, among other things, 20 Early Dynastic tablets plus many fragments<sup>78</sup>. The Ur III tablets from the so-called “registrar’s office”, room 8 of the Dublamah at Ur, were actually found in Kassite period fill, 5-6 tablets deep<sup>79</sup>. Old Babylonian House No. 1 Broad Street at Ur contained the remains of at least three different groups of tablets, un-recycled: one group of Ur III administrative texts, one or two groups of Old Babylonian administrative texts and a group of Old Babylonian school tablets<sup>80</sup>. At Old Babylonian Isin were found widely separated fragments of a literary tablet that had been thrown into the street<sup>81</sup>. At Old Babylonian Eshnunna many tablets were found in a dump context, others found “in various stages of preservation” in a drain, and yet others directly paved over<sup>82</sup>; one letter was found in a wall and another in a staircase<sup>83</sup>. At Babylon a group of Old Babylonian tablets (including some that were cancelled) and fragments was found carefully laid level in the foundation fill of a house<sup>84</sup>; the excavator notes that tablets were found more commonly in secondary than in primary contexts, sometimes in the street. Examples from Old Babylonian Mari show tablets used in construction fill in floors or benches<sup>85</sup>. At Old Babylonian Chagar Bazar tablets and already broken fragments were found deliberately discarded in a ditch<sup>86</sup>. From Old Babylonian Terqa is the discarded remains of the archive of Puzurum<sup>87</sup>. Tablets from Ugarit dating to before the Hittite conquest were found in rubbish or construction contexts<sup>88</sup>. A late second millennium fragment was found in the mortar of a wall at Tell Munbaqa<sup>89</sup>. The early Neo-Babylonian archive of the governor of Nippur and his retinue was found packed around a jar containing a child’s burial<sup>90</sup>. Likewise in a private house at Neo-Assyrian Ashur, groups of tablets and fragments were found in and around burials<sup>91</sup>. At the Neo-Babylonian temple of Nabu-ša-hare in Babylon, some of the tablets were trampled into the floor and used to raise the floor level<sup>92</sup>; some were even found in the stairs<sup>93</sup>. The Neo-Assyrian tablets from Room K of the Governor’s Palace Archive at Nimrud were used as fill to raise the floor level<sup>94</sup>. A fragment was found in a brick at Neo-Assyrian Dur Katlimmu<sup>95</sup>. And Rassam recounts Neo-Assyrian tablet fragments being found in the

<sup>77</sup> WESTENHOLZ 1987, pp. 21-22.

<sup>78</sup> HILPRECHT 1903, p. 388.

<sup>79</sup> WOOLLEY 1925, p. 392, pl. XLII: 2.

<sup>80</sup> CHARPIN 1986, pp. 466-468.

<sup>81</sup> EDZARD - WILCKE 1977, p. 84. A similar explanation is probable for dispersed fragments such as those found in the Western Archive at the Royal Palace in Ugarit, for example (for details of these fragments see VAN SOLDT 1991, p. 50, n. 27).

<sup>82</sup> LLOYD 1940, pp. 32 (including Ur III texts), 52 (letters to Bilalama were found under a pavement dating to the later part of his reign or that of his successor), 79 (drain group).

<sup>83</sup> WHITING 1987, nos. 46 and 17.

<sup>84</sup> KOLDEWEY 1914, p. 246.

<sup>85</sup> MARGUERON 1986, pp. 150-151; CHARPIN 1984a,

pp. 107-108.

<sup>86</sup> TUNCA 2008, p. 10.

<sup>87</sup> BUCCELLATI in ROUALT 1984, pp. xii-xiii.

<sup>88</sup> VAN SOLDT 1991, pp. 140 n. 150, 141.

<sup>89</sup> MAYER 2001, no. 84.

<sup>90</sup> COLE 1996, pp. 1, 4 fig. 3.

<sup>91</sup> PEDERSEN 1986 vol. II, p. 121; see further p. 140.

<sup>92</sup> Walker (personal communication) recalls the discovery at Isin of lumps of clay trodden into the floors. These lumps revealed the remains of wedges which were too hopeless to read and the fragments were not retained.

<sup>93</sup> CAVIGNEAUX 1999, p. 386.

<sup>94</sup> POSTGATE 1973, pp. 4-5.

<sup>95</sup> RADNER 2002, p. 25.

walls of a palace in Nineveh<sup>96</sup>. It is not meaningful to refer to such activity as recycling. This form of re-use is straightforward disposal. It must have been common.

#### CONCLUSIONS

There is a widespread tendency in Assyriology to assume that there is manifest and overwhelming evidence for systematic recycling of tablets to form new tablets. Yet while it seems safe to assume that some recycling of tablets did take place, the evidence for it is very limited<sup>97</sup>, and evidence of its absence exists. The extent of recycling has probably been over-estimated. The nature and processes of recycling are rarely given detailed consideration, and scribal practices largely ignored.

It is not clear that tablets were used in as great quantities as often assumed. We probably overestimate the time scribes spent actually producing tablets. It would be interesting to see Tanret's estimates extended to institutional contexts<sup>98</sup>. The easiest way to get rid of a tablet would have been simply to throw it away, inside or outside the building, elsewhere in the city, or in the nearby water-courses<sup>99</sup>. It seems likely that the vast majority of broken tablets achieved their form not as a result of 19<sup>th</sup> century excavation practices, but rather as a result of being discarded in antiquity.

Raw tablet clay was readily available in limitless quantities, at no cost, and required minimal preparation<sup>100</sup>. Levigation was not always considered necessary and in some cases could have been counter-productive. In the ancient world there was not the same sense of constant urgency that is felt in the modern world, and labour was low cost. It is not clear that recycling would bring significant advantage. We should also consider the possibility that scribes (or their paymasters) preferred to source new clay on magical or superstitious grounds, by force of habit or tradition, or on logistical considerations.

We might question the likelihood of scribes systematically weeding out obsolete material from their archives on a regular, frequent basis. It is known, for example, that single transaction tablets could be retained even after being entered into summary documents, well exem-

<sup>96</sup> P 2892, a letter sent by Rassam to the British Museum, from Mosul, 6<sup>th</sup> April 1878 records: "The most extraordinary thing is that in digging in a solid brick wall between the two chambers Nos. XLVIII and X Plan 1 'Layard's Nineveh and Babylon' we found fragments of these terracottas" (referring here to inscribed clay tablets).

<sup>97</sup> Although it must be conceded that we would often not be able to tell if any given tablet had been recycled.

<sup>98</sup> TANRET 2004.

<sup>99</sup> MILLARD 2005, p. 313 comments: "... out-of-date documents would be discarded, thrown into the river, on to a rubbish heap, or used as rubble in

construction work. Occasionally, as at El-Amarna, some might be overlooked or simply left in a corner, perhaps in a basket or jar. The majority of the archives from past reigns would be jettisoned."

<sup>100</sup> STARR 1939, p. 443 reports that the clay of the Nuzi tablets under study by him was highly purified, lacking any visible quantity of sand. He goes on to note that experiments revealed that such clay could be obtained by allowing the water to seep or evaporate away from a wet mixture of common clay. The same effect could be observed in every dried-up puddle after a rain-storm. This raises the possibility of not even having to travel to a river, canal or pit to obtain suitable clay.

plified at Ur III Ur<sup>101</sup> and Old Babylonian Mari<sup>102</sup>. And exactly the fact that they can survive in large numbers for 20 or 30 years suggests that recycling was limited. In dated archives the presence of an obsolete document causes no harm, until it becomes hard to find the ones that are still valid. It is more plausible to posit sporadic archive clearance. Such a practice would not have yielded a steady and even supply of clay for new tablets.

In contexts where tablets have been found, pots or brick-built structures are routinely interpreted as “recycling bins”. These structures may in some cases have functioned as clay stores and/or sites for clay processing, but their function as recycling facilities is far from clear. Neither was such equipment essential for recycling. Even when jars or bins were present, clay working could take place elsewhere. And the presence of tablets does not necessarily mean that a deposit must be interpreted within a scribal context. The most plausible venue for recycling is “school” contexts, but even there its scope is limited. Surviving school deposits include materials produced over a long period of time<sup>103</sup>. Texts survive from first steps or elementary to more advanced levels. Systematic recycling outside of school contexts has yet to be satisfactorily demonstrated. Were recycling standard practice, and were jars or bins required for it, we would expect to find installations in most or all areas of scribal activity. It is surprising how few have been found. The evidence, sparse as it is, suggests that recycling structures were neither universal nor permanent. They were certainly not standardised.

Re-use of tablets is a phenomenon that encompasses a variety of practices targeted towards a range of purposes. Recycling of tablet clay for use as new tablets is just one part of that, and itself can be broken down into a variety of practices. It is not possible somehow to simply “smooth out” the surface of tablets and make them suitable for re-inscription. Erasure leaves tell-tale traces. Erasure and re-inscription is restricted to use within a short period following the point of manufacture, ruling this out as an effective method for recycling old archival documents. Wrapping new clay around old is not a viable procedure and can safely be dismissed from consideration entirely. Re-use by levigation of old tablets can be ruled out in some cases and would in general have been redundant. Re-hydration and re-moulding is the only plausible process by which widespread, systematic recycling would have taken place. It is a tempting explanation for the absence of evidence, but little more than that at present. The absence of tablets indicates only that they have been disposed of in a manner such that we have not found them; there is more than one possibility for that. The very examples heralded as archaeological proof of the practice themselves provide some of the greatest challenges to the standard assumptions. The interpretation of such deposits requires attention to the questions of who was recycling, and what, when, where and how they were recycling. The proposed examples of tablet recycling all differ widely from each other in a number of ways, from the volume of clay, rapidity of recycling, nature of the process and many other features. There does not seem to be consistency even between examples of the same type. To the extent that these really may be evidence of recycling, they demonstrate

<sup>101</sup> VAN DE MIEROOP 1999-2000.

<sup>102</sup> CHARPIN 1984.

<sup>103</sup> A illustration of this in a single tablet is pro-

vided by BM 77720, a fragment of Late Babylonian school cylinder, with the text of an elementary syllabary accidentally impressed on part of its surface.



just how varied practices and techniques could have been; and they further suggest how limited recycling may have been.

Obsolete tablets must always have lain around in significant numbers. They were just small lumps of clay in a city where the houses and the entire mound they sat on were made of clay. We might then ask where so many discarded tablets went that they have not been found. One suitable location would be a river or canal, where they would dissolve away; this could also be an easy way to generate ready-levigated tablet clay for the next batch of tablets. They could also have been discarded in general dumps with other rubbish; examples of this practice were documented above. The extent of excavation of Mesopotamian cities has been very limited so far. It should also be borne in mind that unbaked tablets exposed to the elements could soon lose their inscription. Such tablets would be very difficult to distinguish from the surrounding clay, and are unlikely to be collected by either excavators or looters. In some cases our understanding may be clarified by the appearance of detailed final reports or other studies; in other cases the information necessary for the secure interpretation of the evidence is simply missing. Careful future excavation, documentation and retention of this previously neglected material are essential if we are to understand the phenomenon of recycling tablet clay.

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#### RIASSUNTO

Le tavolette d'argilla offrono informazioni non solo attraverso quello che c'è scritto su di esse ma anche attraverso la loro consistenza fisica. Esse rivelano le tecniche impiegate per fabbricarle e i processi preparatori del materiale grezzo. Esse possono anche rivelare informazioni sui trattamenti successivi e possibili riusi. È stato ampiamente ritenuto che le tavolette siano state in antico sistematicamente riciclate in una varietà di modi. Questo articolo raccoglie e ri-analizza le evidenze a nostra disposizione, dimostrando che le nostre conoscenze sono meno evidenti di quanto non si sia sempre supposto e che la pratica di riciclare le tavolette è stata ampiamente sovrastimata. Una delle tecniche proposte deve essere ora abbandonata grazie ad un insieme di considerazioni, mentre la dimensione dell'utilizzo delle altre può essere ormai considerata limitata a certi casi.

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